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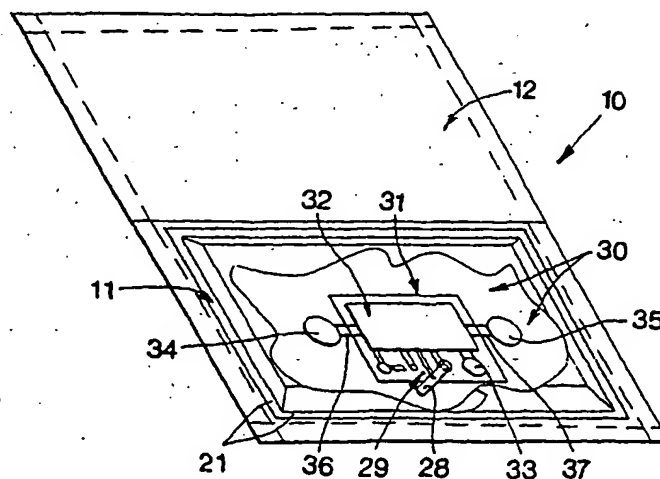
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(54) Title: **ELECTRONIC SYSTEM USING CARDS, POSTCARDS, LETTER-CARDS, ENVELOPES FOR MAILED CORRESPONDENCE, FLAT AND LEVEL OBJECTS IN GENERAL**



(57) Abstract: Electronic system (30) for sending audio messages, vocal and musical, using cards, postcards, letter-cards (10), envelopes, for mailed correspondence, flat and level objects in general, by association to said flat and level objects of a flat and level device (30) for recording and listening comprising a microphone (34), a loudspeaker (35), an integrated circuit (32) and a switch (29) which, in one position, determines connection of the analog-digital converter connected to the microphone (34) with the microprocessor and so with the flash memory and, in a second position, connection of the microprocessor and therefore of the flash memory to the digital-analog converter connected to the loudspeaker (35).

WO 01/06515 A1

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**Electronic system using cards, postcards, letter-cards, envelopes for mailed correspondence, flat and level objects in general**

15 The invention concerns systems for sending messages through the post and in other ways.

Telecommunications are a currently used method of sending written messages on some kind of card or similar flat material.

Also well-known are the letter-cards that play music for sending  
20 good wishes or for various forms of promotion.

In common use are telefax machines whereby writing or some kind of graphic expression is converted into electric pulses and, on arrival, reconverted into its original form for sending and receiving written material generally.

25 Purpose of the invention is that of sending vocal and musical messages, on objects similar to ordinary cards, letters, letter cards, prepared by the sender, such an invention being of great utility and arousing widespread interest, as will be explained below.

Subject of the invention is an electronic system using cards, letter  
30 cards, envelopes, flat and level objects generally for sending audio messages through the post or by some other means.

A flat device for recording and reproducing sound is associated to said flat and level objects, having a flat and level base, said device comprising a microphone, a loudspeaker, a means of electric feed, an electric switching means and a printed integrated circuit, these  
5 too being flat and level and placed alongside each other.

The messages can be vocal, musical or both together, as desired.

In one advantageous type of execution the base for the recording and listening device consists of a part of said flat and level means protected by a covering sheet, or something similarly thin, whose  
10 edges are fixed to that part of the means used as a base.

Said device for recording and listening is thus placed between two matching sheets, one forming a part of the base, and the other forming the cover.

Two sets of perforations are made in the cover, one at the position  
15 of the microphone and the other at that of the loudspeaker.

The base of the recording and listening device may consist of a light sheet either of paper or of plastic material.

Length and width of the flat and level base are preferably less than those of a card, or the like, that it is desired to send by post or by  
20 another form of despatch, making said base small enough to be put inside a letter card or the like whose edges can be then sealed.

The base of the recording and listening device comprises positions for the printed circuit, for the microphone and loudspeaker and for a switching means to change over from recording to listening and vice  
25 versa.

Thickness of the base of said above device is a few mm.

The integrated circuit comprises an amplifier for amplifying the messages emitted in front of the microphone, an analog-digital converter of said signals, a microprocessor that, at one position of  
30 the switch, receives the signals emitted from the first analog-digital converter and sends them to a flash memory circuit and, at the

other position of the switch, picks up the signals stored in the flash memory and sends them to a digital-analog converter which in turn amplifies them and sends them to the loudspeaker.

5 In the first position the switch connects an analog-digital converter to the microprocessor and so to the flash memory, while in the second position it connects the microprocessor, and therefore the flash memory, to the digital-analog converter.

10 In one advantageous execution, message recording is perfected by fitting a recorder with a microphone, a loudspeaker, an integrated circuit, controls for operating the whole device, and with an electromagnetic transducer.

Following actuation of a suitable control, a message is recorded by converting it into weak electric currents that are sent on to an amplifier in the integrated circuit which, after amplifying them, sends  
15 them on to an analog-digital converter for conversion of the analog signals into a binary digital code that passes to a microprocessor, forming part of the integrated circuit, where it is decoded and stored.

20 Having made the recording, the recorded message can be heard and checked by working another control that causes the microprocessor to read what has been stored, transfers it to a digital-analog converter that converts the stored binary-digital content into an analog electric signal which, amplified by an amplifier, is sent on to the loudspeaker.

25 After the recording has been approved, it can be transferred to the means of despatch by insertion into a slit made to receive it in the recorder.

30 On operating a third control, the microprocessor reads what has been stored converting it into a serial code that is then sent to a driver amplifier that supplies the energy needed by an electromagnetic transducer for converting the electric signal into electro-

magnetic waves that transfer the message to be recorded onto the despatching means.

In another advantageous version, the system uses a multimedia personal computer and a recorder to improve the recording.

- 5 The computer can of course record vocal messages and, if needed, combine them with pieces of music.

Having opened a file in the computer for the message to be recorded, this file is sent to the recorder that transfers it by electromagnetic waves to the despatching means inserted in a slit made to  
10 receive it in the recorder.

The recorder sends the message, by electromagnetic waves, to the despatching means that receives them from a DC coil that activates a transistor for feeding and operating an integrated circuit fed by the battery in the object to be despatched.

- 15 Specially provided circuits amplify the signal received from the coil, converting it into a square wave signal, then sending said converted signal, containing the code with the vocal message to be recorded, to a microprocessor that decodes it and puts into the flash memory in the object to be despatched..

- 20 The invention offers evident advantages.

For the first time worldwide a message, both vocal and vocal-musical, can be sent to someone who, on receiving it, can listen to it at any moment, thus creating contact of an epistolary nature between two people at a distance, but in a way that is far more  
25 natural and involving than mere letter-writing, in fact becoming as warm and expressive as if the sender were really present.

The invention here described can be highly effective from both the human and commercial aspects in view of the great difference between a spoken message and a written one from the standpoints  
30 of expression and involvement, and also the rapidity with which it can be made.

The invention therefore possesses a wide variety of applications of a universal nature as regards not only social relations but also its purely commercial effects.

Characteristics and purposes of the disclosure will be made still clearer by the following examples of its execution illustrated by  
5 diagrammatically drawn figures.

Figure 1. Letter card made using the electronic system subject of the invention, with the recording and reproducing device for audio messages, open, in perspective.

10 Figure 2. The card showing the electronic device, perspective.

Figure 3 Layout of the electronic circuit of the device on the card.

Figure 4 The card after making the recording, sealed and ready for despatch, perspective.

Figure 5. The card opened by the consignee, in the position for  
15 listening to the message, perspective.

Figure 6. Another version of the electronic device, comprising a fixed recorder, perspective.

Figure 7. Layout of the electronic circuit for the fixed recorder.

Figure 8. Another version of the electronic device comprising a fixed  
20 recorder connected to a computer, perspective.

Figure 9. Layout of the electronic circuit of the device, on the card, as seen in Figure 8.

The letter card 10 comprises two parts, 11 and 12, that can be folded onto each other and sealed by a gummed strip 15 on the  
25 edge 13, prepared for tear-off 14.

Placed on the inner face of part 11 of the letter card, inside a cover 20 of substantially the same size as said face, is the electronic device 30, subject of the invention.

Said cover 20 is of thin card or light plastic material, overall  
30 thickness being limited to a few millimetres.

Its central flat area 22 is joined by inclined sides 23 to the flat edge

21 glued onto the inner face of part 11 of the letter card.

Visible on said cover 20 are perforations 25 below which is a microphone, and perforations 26 below which is a loudspeaker.

The electronic device 30 (see figures 2 and 3) substantially comprises an electronic card 31 with a printed integrated circuit 32, fed  
5 by a battery 33, with a microphone 34 and piezoelectric loudspeaker 35 connected to the printed integrated circuit 32 by wires 36, 37 and switch 28 with lever 29.

The lever 28 of the switch 29 projects through an eyehole 27 made  
10 in the longer edge 16 of the cover 20, movement of the lever to the left being made for recording by the electronic device 30 and to the right for listening.

The printed circuit 32 comprises an amplifier 30, an analog-digital converter 41, a microprocessor 42, the flash memory 43, digital-  
15 analog converter 44 and amplifier 45 on the analog signal.

For recording a message by voice or music, the lever 28 on the switch 29 is moved to the left after which the device is ready.

The microphone 34 converts the message into weak electric currents then sent to the amplifier 40 which amplifies them and  
20 sends them on to the analog-digital converter 41 for converting the analog signal into a binary digital code; this is then sent to the microprocessor 42 that decodes it and memorizes it in the flash memory 43 where its data are kept even when the circuit is turned off and therefore without electric energy available.

25 Having done all this the letter card can be sealed and sent to the consignee who, in Figure 4, has begun to open it.

When the card has been opened (Figure 5) the consignee moves the lever 28 to the right to listen to the recording.

Again referring to figure 3, the integrated circuit 32 reads, through  
30 the microprocessor 42, the content previously recorded in the flash memory 43 and transfers it to the digital-analog converter 44; here

the binary-digital content of the flash memory is converted into an analog electric signal which, amplified by the amplifier 45, is sent to the piezoelectric loudspeaker 35 where the electric signal is converted into audible sound waves.

- 5 Alternatively, to facilitate and improve recording, the recorder 50 can be used.

This recorder (figures 6 and 7) comprises the base 51, button switches 53-55 for the recording process, the microphone 56 and loudspeaker 57 with which to listen to the recorded material and, if  
10 necessary, correct it before it is sent off.

In the box-shaped wall 52 at 90° fixed to the base 51, is a vertical slit 61 in which to insert the electronic part of the letter card 10 and the electromagnetic transducer 58.

To begin recording a message, press button switch 53.

- 15 The microphone 56 converts the vocal message to be recorded into weak electric currents that go to the amplifier 71 in the integrated circuit 70; here they are amplified and sent to the analog-digital converter 72 for converting the analog signal into a binary digital code which is sent to the microprocessor 73 that decodes it and  
20 memorizes it in the flash memory 74.

After recording, the message can be heard by pressing button 54.

- The microprocessor 73 reads the binary-digital content memorized in the store 74 transferring it to the digital-analog converter 75 where it is converted into an analog electric signal then amplified by  
25 the amplifier 76 and passed to the piezoelectric loudspeaker 57 for converting the electric signal into audible sound waves.

To record a message the letter card 10 is inserted in the slit 61 in the recorder 50.

- On pressing the button switch 55 the microprocessor 73 reads the  
30 message in the store 74, converts it into a serial code that is sent to the driver amplifier 76 which supplies the energy needed by the



electromagnetic transducer 58; this converts the electric signal into electromagnetic waves for transferring the message to be recorded on the letter card.

To facilitate recording and improve the message a multimedia  
5 computer 80, connected to a recorder 81, can record spoken or musical messages or, if required, a mix of the two. The computer sets up a file containing the message to be recorded; this is sent to the recorder 81 from where it is transferred, by electromagnetic waves, to the letter-card 10 put into the slit 82 in the recorder 81.

10 The device on the letter-card 10 comprises an electronic card 85 and printed integrated circuit 86 fed by a battery 87, and a piezoelectric loudspeaker 88.

The electromagnetic waves (figure 9) are received by the letter card 10 through the coil 90 that transforms the electromagnetic signals  
15 from the recorder 81 into AC electric signals.

The diode 91 with condenser 92 converts the AC from the coil 90 into DC able to activate the transistor 93 and therefore activate the integrated circuit 82 fed by the battery 87.

The coil 90 is also connected to the amplifier 94 that amplifies the  
20 signal from said coil, then converting it into a square wave signal by the squaring circuit 95.

This signal contains the code for recording the audio message then sent to the microprocessor 96 for decoding and storage in the flash memory 97.

25 While listening to the message, having moved the lever 28 to the right, through the microprocessor 96, the integrated circuit 86 reads the contents of flash memory 97 and transfers it to a digital-analog converter 98 for converting the binary-digital content of the flash memory 97 to an analog electric signal, then amplified by amplifier  
30 99 and sent to the piezoelectric loudspeaker 88 for converting the electric signal into audible sound waves.

CLAIMS

1. Electronic system for sending audio messages using cards, letter-cards (10), envelopes, for correspondence by mail, flat and level objects in general,  
5 characterized by association to said flat and level objects (10), by means of a flat and level base (11), of a flat and level device (30) for recording and listening comprising a microphone (34), a loud-speaker (35), a means of electric feed (33), an electric switch (29) and a printed integrated circuit (32), these also being flat and level  
10 and placed side by side.
2. Electronic system for sending audio messages using cards, letter-cards (10), envelopes, for correspondence by mail, flat and level objects in general, as in claim 1,  
characterized in that the messages are vocal.
- 15 3. Electronic system for sending audio messages using cards, letter-cards (10), envelopes, for correspondence by mail, flat and level objects in general, as in claim 1,  
characterized in that the messages are musical.
4. Electronic system for sending audio messages using cards, letter-cards (10), envelopes, for correspondence by mail, flat and  
20 level objects in general, as in claim 1,  
characterized in that the messages are vocal and musical.
5. Electronic system for sending audio messages using cards, letter-cards (10), envelopes, for correspondence by mail, flat and  
25 level objects in general, as in claim 1,  
characterized in that the support of the device (30) for recording and listening consists of one part (11) of said flat and level object (10) protected by a covering sheet (20), or some other thin means, the edges of which are fixed to the edges of the part (11) of the  
30 means (10) used as a supporting base, said device (30) for recording and listening being thus inserted between two matching

sheets (11, 20), one being a part (11) of the means (10) used as a base and the other a cover (20), there being made in said cover (20) two sets of perforations (25, 26) corresponding respectively to the positions of the microphone (34) and of the loudspeaker (35).

- 5 6. Electronic system for sending audio messages using cards, letter-cards (10), envelopes, for correspondence by mail, flat and level objects in general, as in claim 1,

characterized in that the base (11) of the device (30) for recording and listening consists of a light sheet of paper.

- 10 7. Electronic system for sending audio messages using cards, letter-cards (10), envelopes, for correspondence by mail, flat and level objects in general, as in claim 1,

characterized in that the base (11) of the device (30) for recording and listening consists of a light sheet of plastic material.

- 15 8. Electronic system for sending audio messages using cards, letter cards (10), envelopes, for correspondence by mail, flat and level objects in general, as in claim 1,

characterized in that the size in length and width of the flat and level base is smaller than that of the letter-card (10) or equivalent means  
20 to be despatched, these dimensions being small enough to permit insertion of said base in a letter-card (10) or equivalent means and to seal the edges (13) of said letter-card.

9. Electronic system for sending audio messages using cards, letter-cards (10), envelopes, for correspondence by mail, flat and  
25 level objects in general, as in claim 1,

characterized in that the base of the device (30) for recording and listening comprises places for the printed circuit (31), for the microphone (34), loudspeaker (35) and for a switching means (29) to move the device (30) from the recording position to that for listening  
30 and vice versa.

10. Electronic system for sending audio messages using cards, let-

ter cards (10), envelopes, for correspondence by mail, flat and level objects in general, as in claim 1, characterized in that thickness of the base of the device (30) for recording and listening is of a few mm.

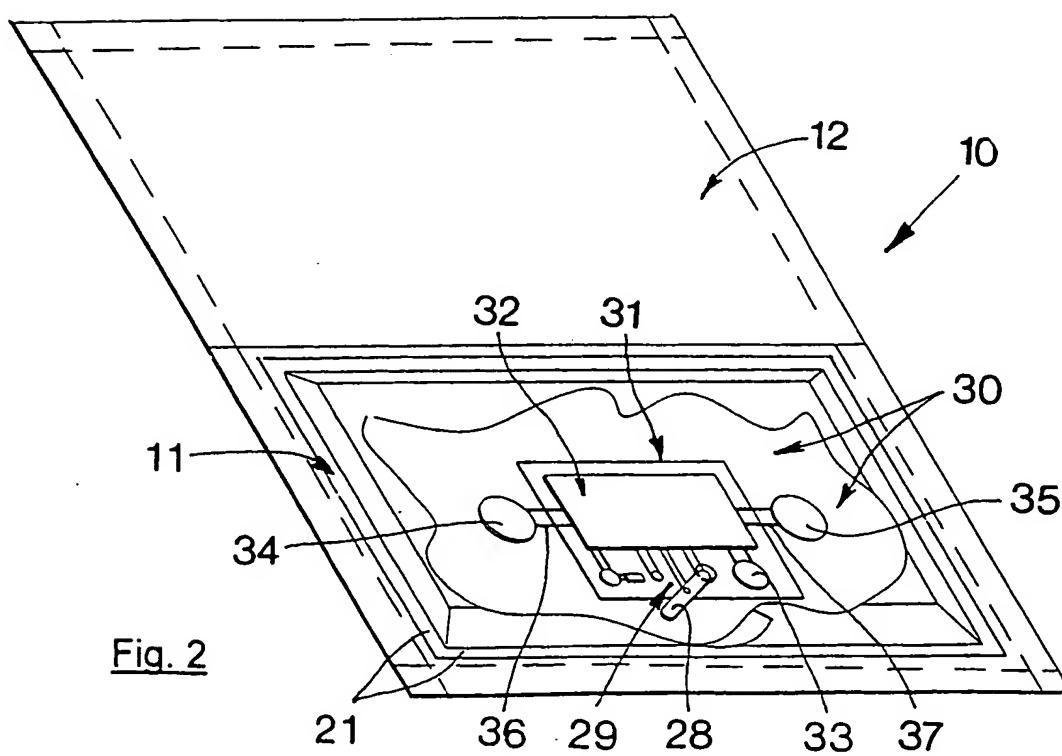
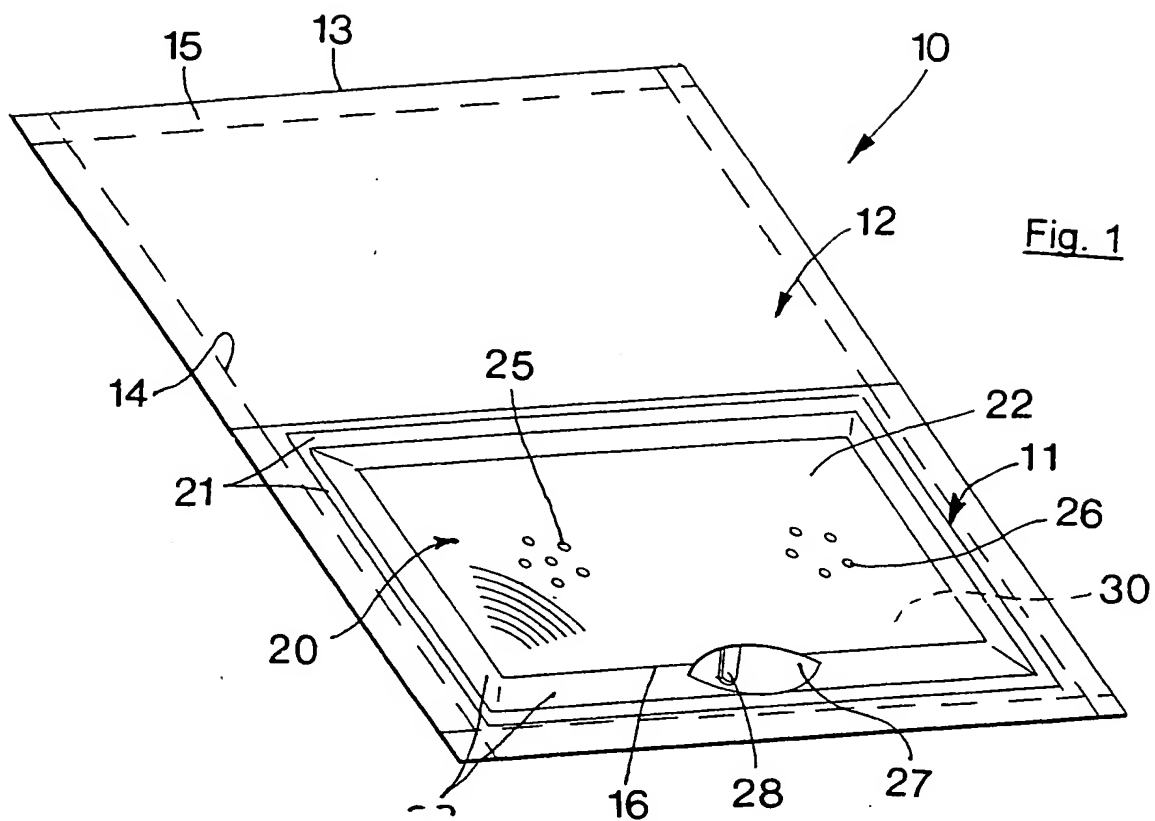
- 5 11. Electronic system for sending audio messages using cards, letter cards (10), envelopes, for correspondence by mail, flat and level objects in general, as in claim 1, characterized in that the integrated circuit (32) comprises an amplifier (40) that amplifies the messages emitted before the microphone  
10 (34), an analog-digital converter (41) of said signals, a microprocessor (42) which, when the switch (29) lies in its first position, receives the signals emitted by the first analog-digital converter (41) and sends them to a flash memory (43) and, when the switch (29) is in its second position, picks up the signals stored in the flash memory  
15 (43) and sends them to a digital-analog converter (45) which, in turn, sends them, amplified (45), to the loudspeaker (35).
12. Electronic system for sending audio messages using cards, letter-cards (10), envelopes, for correspondence by mail, flat and level objects in general, as in claim 1,  
20 characterized in that, to get the best possible recording of messages, this is done by a recorder (50) fitted with a microphone (56), a loudspeaker (57), an integrated circuit (70), controls (53-55) for operating the device, and with an electromagnetic transducer (58), the message being recorded, following activation of a control (53),  
25 by conversion of said message into weak electric currents that are sent to an amplifier (71) in the integrated circuit (70) which amplifies them and sends them to an analog-digital converter (72) for converting the analog signals into a binary digital code that is sent to a microprocessor (73), forming part of the integrated circuit (70),  
30 that decodes and stores it, it being possible to hear and check the recorded message by operating another control (54) so causing the

microprocessor (73) to read the contents of the memory (74), transfer it to a digital-analog converter (75) that converts the binary-digital content of the memory into an analog electric signal which, amplified by an amplifier (76) is sent to the loudspeaker (57), it  
5 being possible, after approval of the recording, to transfer said recording onto the means (10) for despatch by inserting it into a slit (61) in the recorder (50) where, by operating a third control (55), the memory (74) is read by the microprocessor (73) and converted into a serial code that is sent to a driver amplifier which supplies an  
10 electromaagnetic transducer (58) with the energy needed for converting the electric signal into electromagnetic waves able to transfer the message to be recorded onto the means (10) to be despatched.

13. Electronic system for sending audio messages using cards, letter-cards (10) envelopes, for correspondence by mail, flat and  
15 level objects in general, as in claim 1,

characterized in that it comprises a multimedia personal computer (80) connected to a recorder (81) to permit creation of a file for the message to be recorded, either vocal or musical and possibly a mix  
20 of both types, sent to the recorder (81) that transfers it, by electromagnetic waves, to the means (10) for despatch, after insertion into a slit (82) in the recorder (81), this latter passing the message to said means (10), by electromagnetic waves received by said means (10) from a DC coil (90) that activates a transistor for feed  
25 and activation of an integrated circuit (86) fed by the battery (87) in the means (10) for despatch, there being circuits (95) to amplify the signal received from the coil (90) converting it to a square wave signal containing the code with the vocal message to be recorded, sending said signal to a microprocessor (96) for decoding and  
30 storage in the flash memory (97) of the means (10) for despatch.

1/6



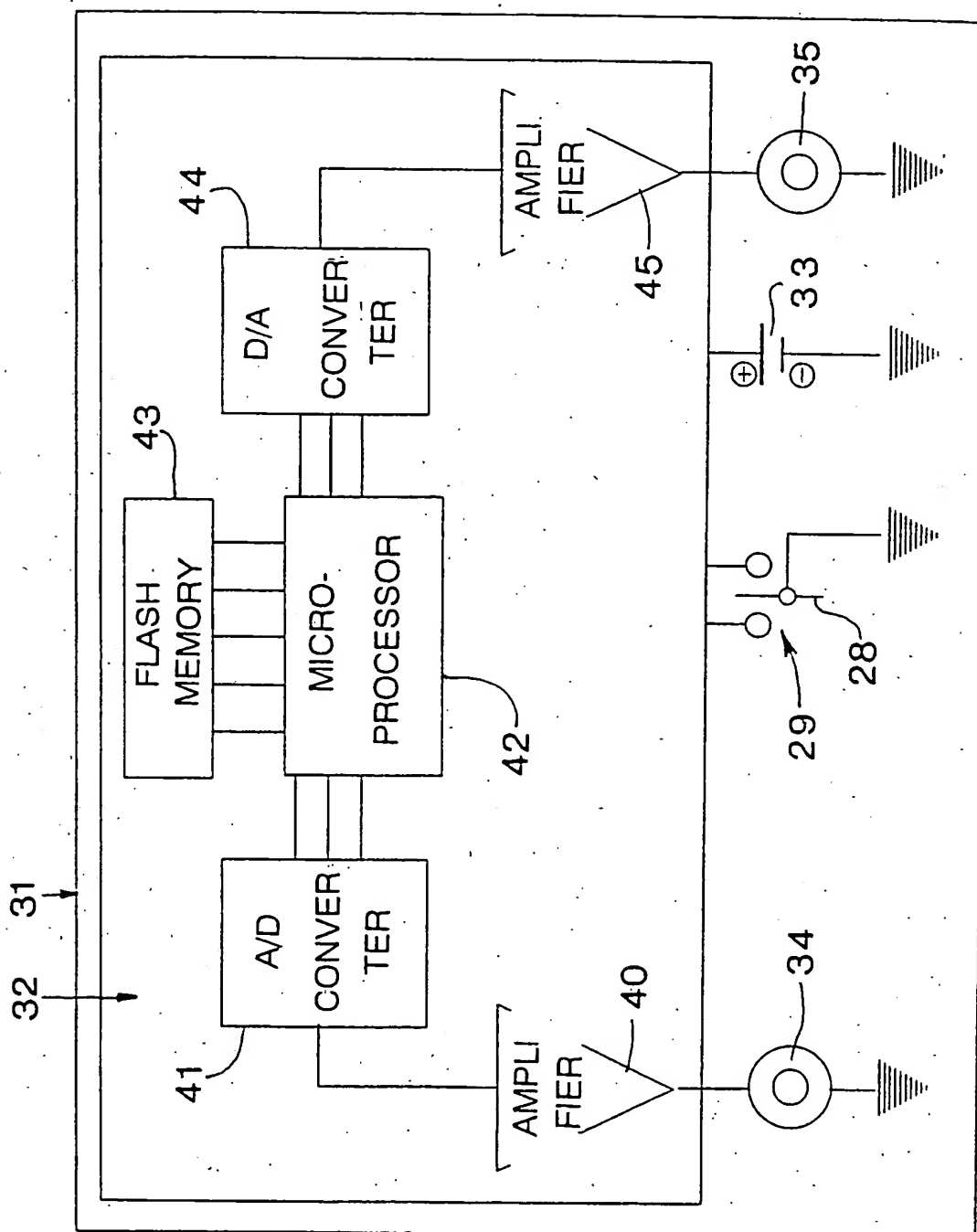
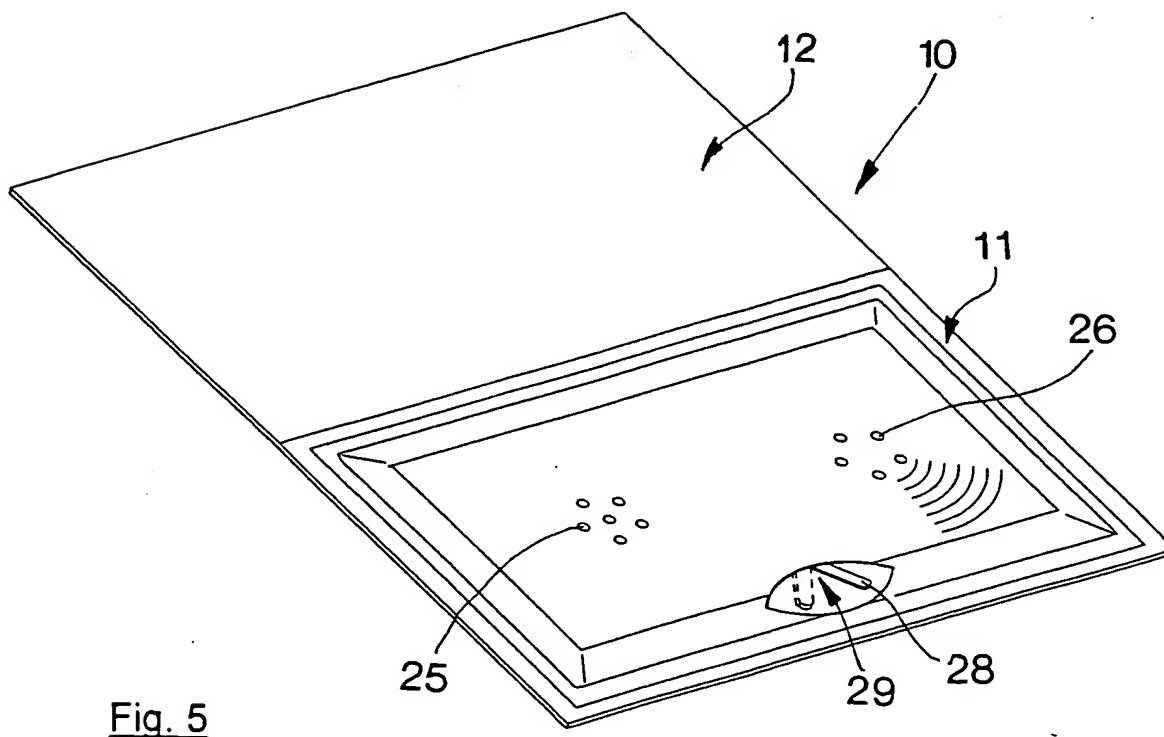
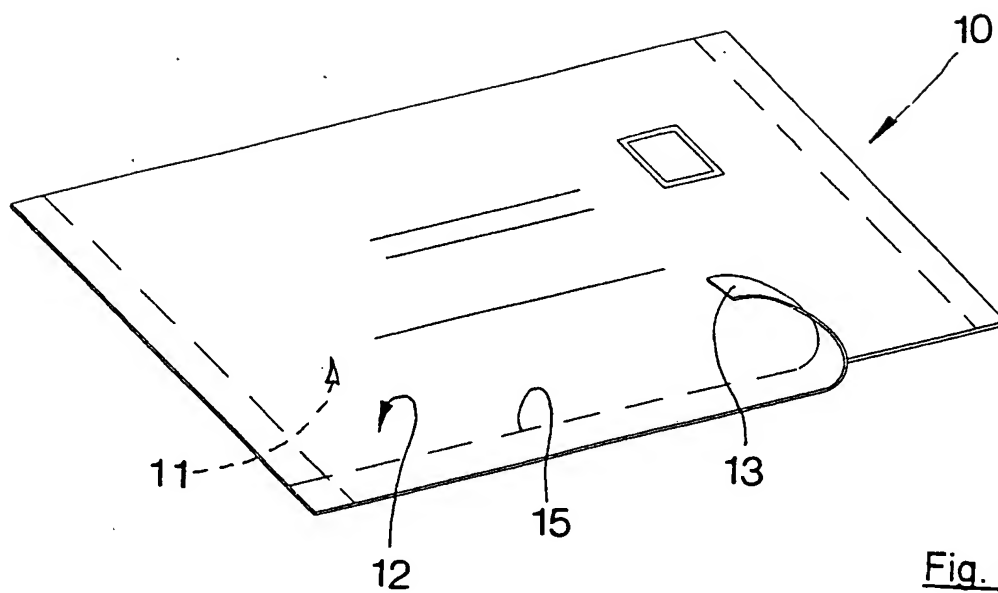


Fig. 3

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4/6

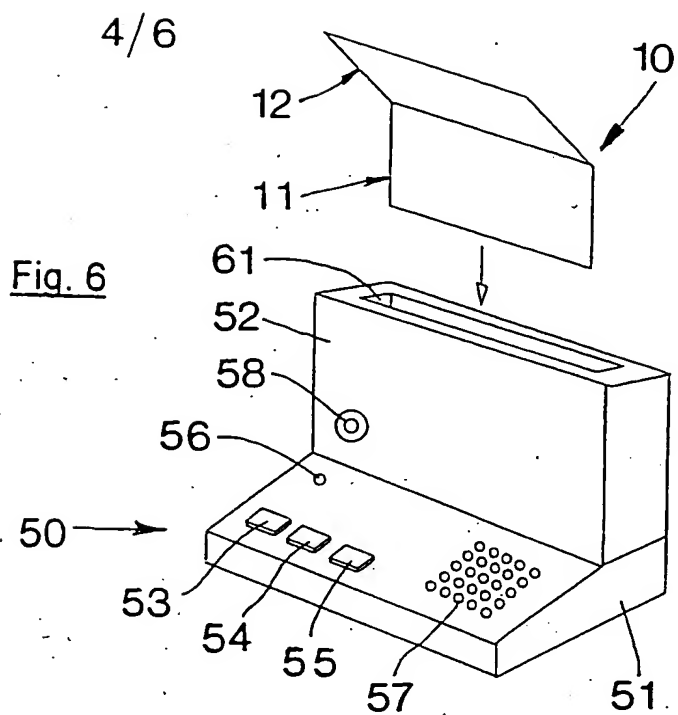
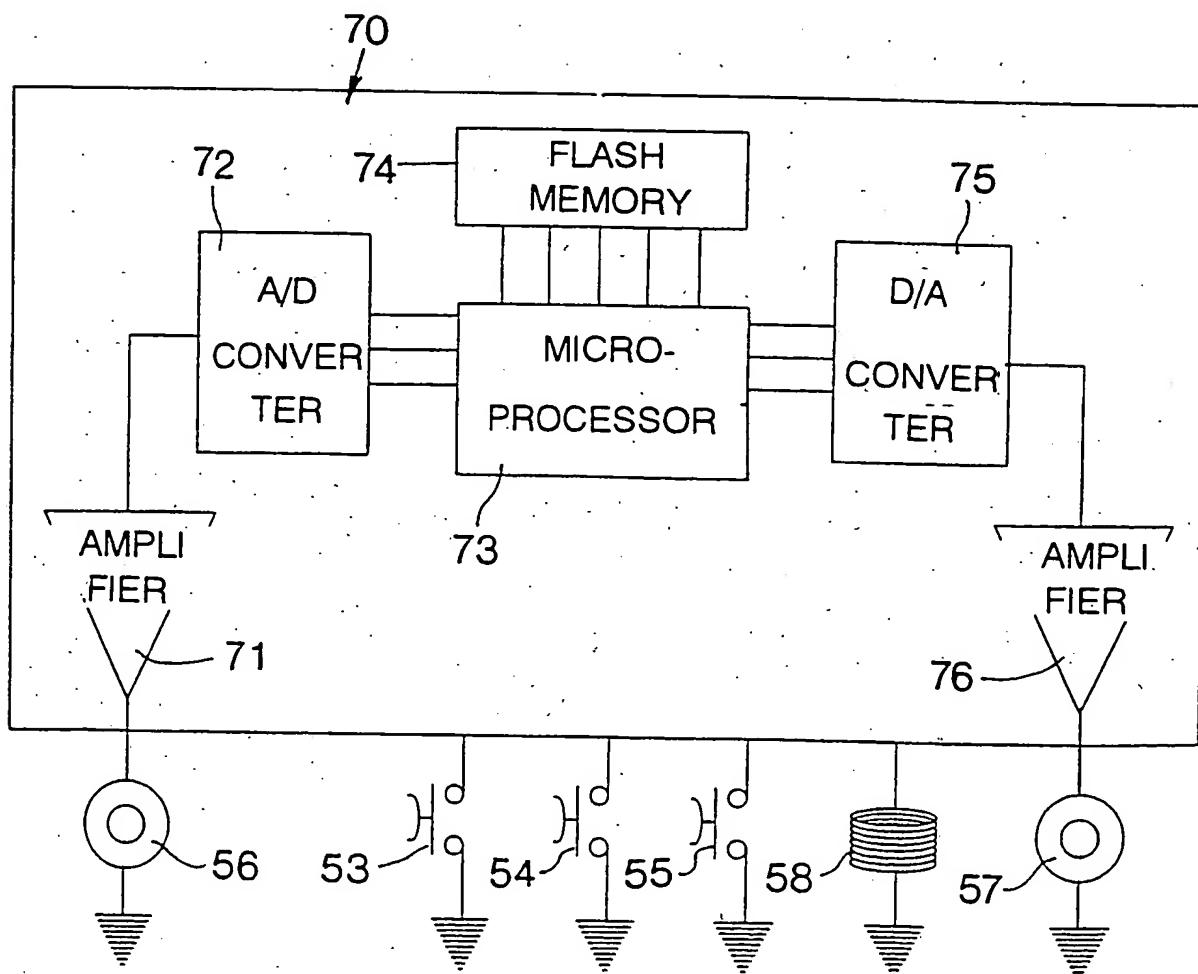


Fig. 7



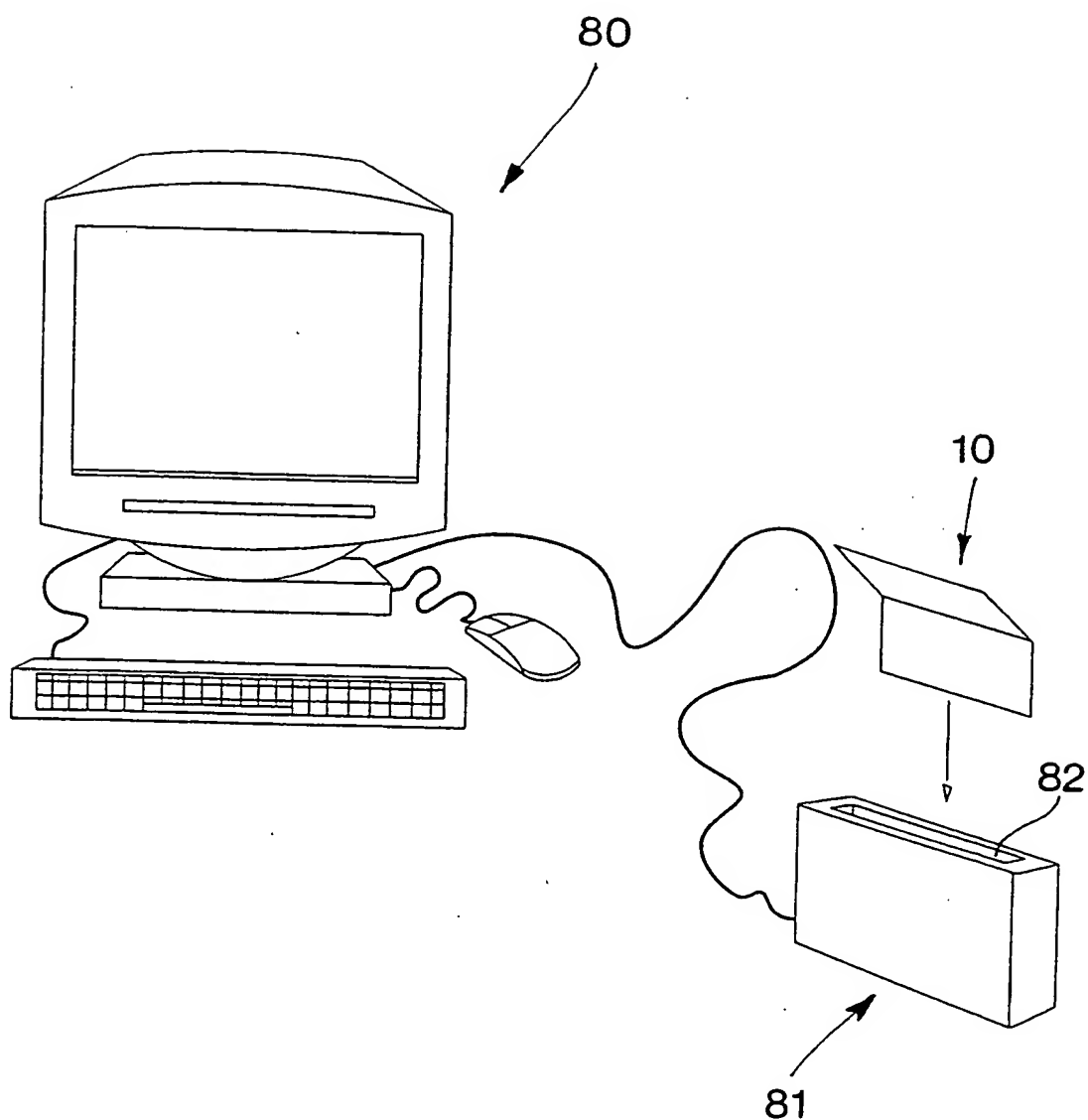
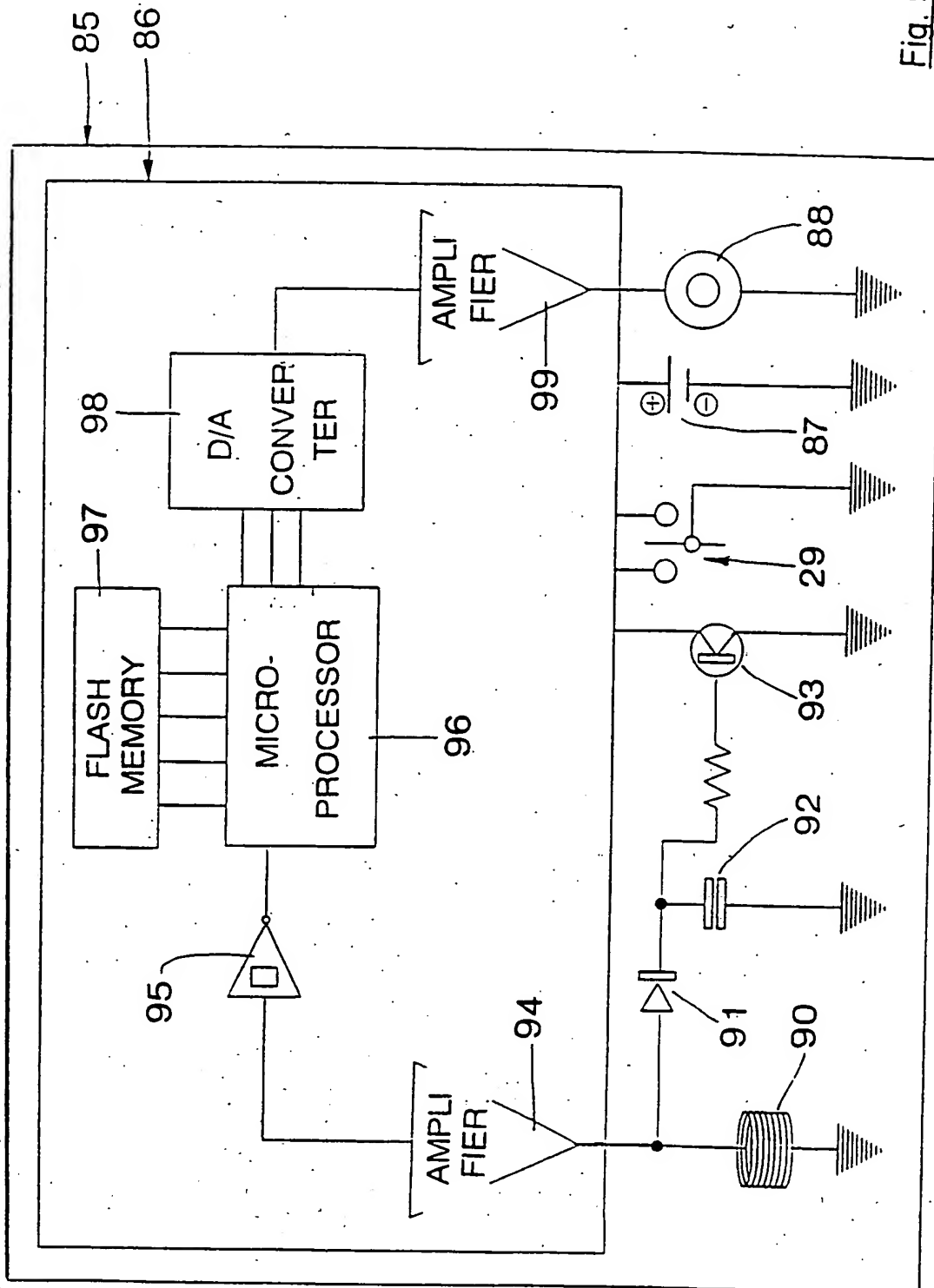
Fig. 8

Fig. 9



# INTERNATIONAL SEARCH REPORT

International Application No.

PCT/IT 99/00243

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 G11C7/16 B42D15/02

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G11C B42D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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Y	---	5-7, 11, 12
	-/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

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Name and mailing address of the ISA

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# INTERNATIONAL SEARCH REPORT

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

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Information on patent family members

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